What is Claimed Is:

1. A method for automatic 3D (three-dimensional) lesion segmentation, comprising the steps of:

determining a 3D surface of a lesion in an original 3D volume space;

transforming the 3D surface of the lesion to a spherical coordinate space;

processing the 3D surface in the spherical coordinate space to determine a lesion surface in the spherical coordinate space which separates the lesion from surrounding normal structure;

transforming the lesion surface in the spherical coordinate space to the original 3D volume space; and

extracting a volume corresponding to the lesion from the original 3D volume space using the transformed lesion surface.

2. The method of claim 1, wherein the step of determining a 3D surface comprises:

extracting a 3D sub-volume from the original 3D volume space which surrounds the lesion;

interpolating image data in the 3D sub-volume to render the 3D sub-volume isotropic; and

determining a 3D edge of the lesion in the isotropic 3D sub-volume.

3. The method of claim 2, wherein the step of determining a 3D edge of the lesion is performed using a 3D Canny edge detection process.

4. The method of claim 1, wherein the step of transforming the 3D surface of the lesion to a spherical coordinate space comprises:

determining a centroid location of the lesion in the original 3D volume space; and

determining a spherical coordinate for each pixel of the 3D surface based on the centroid location; and

generating a 2D representation of the 3D surface in the spherical coordinate space using the spherical coordinates.

5. The method of claim 4, wherein the centroid location of the lesion is determined by an automated process.

6. The method of claim 4, wherein the centroid location of the lesion is selected by a user.

7. The method of claim 4, further comprising normalizing the 2D representation of the 3D surface in the spherical coordinate space.

8. The method of claim 7, further comprising median filtering the normalized 2D representation.

9. The method of claim 4, wherein the step of processing the 3D surface in the spherical coordinate space comprises the steps of:

extending the 2D representation of the 3D surface in the spherical coordinate

space; and

interpolating the extended 2D representation to determine a separating surface that separates the lesion from an anatomical structure to which the lesion is attached.

10. The method of claim 1, wherein the step of transforming the lesion surface in the spherical coordinate space to the original 3D volume space comprises mapping vertices in the original 3D volume space to the spherical coordinate space.

11. The method of claim 10, wherein the step of extracting the volume corresponding to the lesion from the original 3D volume space using the transformed lesion surface, comprises the step of including all pixels in the original 3D volume space that lie within or below the lesion surface in spherical coordinates as part of the lesion volume.

12. The method of claim 1, wherein the lesion is a colonic polyp.

13. The method of claim 12, wherein the step of processing the 3D surface in the spherical coordinate space to determine a lesion surface in the spherical coordinate space which separates the lesion from surrounding normal structure lesion surface, comprises the step of determining a polyp neck.

14. The method of claim 1, further comprising the step of measuring one or more parameters associated with the extracted volume.

15. The method of claim 1, further comprising repeating the method steps in an iterative manner to obtain convergence of a volume value.

16. The method of claim 1, further comprising the step of:

determining if the lesion surface representation in the spherical coordinate space comprises a false surface that is not actually part of the lesion; and

removing a false surface that is determined to be included in the lesion surface representation.

17. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for automatic 3D (three-dimensional) lesion segmentation, the method steps comprising:

determining a 3D surface of a lesion in an original 3D volume space;

transforming the 3D surface of the lesion to a spherical coordinate space;

processing the 3D surface in the spherical coordinate space to determine a lesion surface in the spherical coordinate space which separates the lesion from surrounding normal structure;

transforming the lesion surface in the spherical coordinate space to the original 3D volume space; and

extracting a volume corresponding to the lesion from the original 3D volume space using the transformed lesion surface.

18. The program storage device of claim 17, wherein the instructions for performing the step of transforming the 3D surface of the lesion to a spherical coordinate space comprises:

determining a centroid location of the lesion in the original 3D volume space; and

determining a spherical coordinate for each pixel of the 3D surface based on the centroid location; and

generating a 2D representation of the 3D surface in the spherical coordinate space using the spherical coordinates.

19. The program storage device of claim 17, wherein the lesion is a colonic polyp.

20. A method for automatic 3D (three-dimensional) lesion segmentation, comprising the steps of:

determining a 3D surface of a lesion within an image dataset in a first coordinate space;

performing a centroid transformation of the 3D surface using a centroid of the lesion in the first coordinate space, to generate a transformed surface representation of the 3D surface in a second coordinate space;

processing the transformed surface representation to determine a lesion surface which separates the lesion from surrounding normal structure; and

transforming the lesion surface in the second coordinate space back to the first coordinate space to segment the lesion from the image dataset.

21. The method of claim 21, wherein the step of determining a 3D surface comprises:

extracting a 3D sub-volume of image data from the image dataset which surrounds the lesion;

interpolating image data in the 3D sub-volume to render the 3D sub-volume isotropic; and

determining a 3D edge of the lesion in the isotropic 3D sub-volume.

22. The method of claim 21, wherein the step of determining a 3D edge of the lesion is performed using a 3D Canny edge detection process.

23. The method of claim 20, wherein the step of performing a centroid transformation comprises performing a spherical transformation.

24. The method of claim 23, wherein performing a spherical transformation comprises:

determining a spherical coordinate for each pixel of the 3D surface based on the centroid location; and

generating a 2D representation of the 3D surface in the spherical coordinate space using the spherical coordinates.

25. The method of claim 20, further comprising the step of automatically determining the centroid location of the lesion in the first coordinate space.

26. The method of claim 20, further comprising the step of a user selecting coordinates of the centroid.

27. The method of claim 20, further comprising normalizing the transformed surface representation.

28. The method of claim 27, further comprising median filtering the normalized transformed surface representation.

29. The method of claim 20, wherein the step of processing the transformed surface representation comprises interpolating the transformed surface representation to determine a separating surface that separates the lesion from an anatomical structure to which the lesion is attached.

30. The method of claim 20, wherein the step of transforming the lesion surface in the second coordinate space back to the first coordinate space to segment the lesion from the image dataset comprises mapping vertices in the image dataset in the first coordinate space to the second coordinate space.

31. The method of claim 30, further comprising segmenting the lesion by including all pixels in the image dataset that lie within or below the lesion surface in the second coordinate space as part of a volume of the lesion.

32. The method of claim 31, further comprising the step of measuring one or more parameters associated with the segmented lesion.

33. The method of claim 31, further comprising repeating the method steps in an iterative manner to obtain convergence of a volume value.

34. The method of claim 20, wherein the lesion is a colonic polyp.

35. The method of claim 34, wherein the step of processing the transformed surface representation to determine a lesion surface which separates the lesion from surrounding normal structure comprises determining a polyp neck.

36. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for automatic 3D (three-dimensional) lesion segmentation, the method steps comprising:

determining a 3D surface of a lesion within an image dataset in a first coordinate space;

performing a centroid transformation of the 3D surface using a centroid of the lesion in the first coordinate space, to generate a transformed surface representation of the 3D surface in a second coordinate space;

processing the transformed surface representation to determine a lesion surface which separates the lesion from surrounding normal structure; and

transforming the lesion surface in the second coordinate space back to the first coordinate space to segment the lesion from the image dataset.

37. The program storage device of claim 36, wherein the instructions for performing a centroid transformation comprises instructions for performing a spherical transformation.

38. The program storage device of claim 27, wherein the instructions for performing a spherical transformation comprise instructions for performing the steps of:

determining a spherical coordinate for each pixel of the 3D surface based on the centroid location; and

generating a 2D representation of the 3D surface in the spherical coordinate space using the spherical coordinates.

39. The program storage device of claim 36, wherein the instructions for performing the step of processing the transformed surface representation comprise instructions for interpolating the transformed surface representation to determine a separating surface that separates the lesion from an anatomical structure to which the lesion is attached.

40. The program storage device of claim 39, wherein the lesion is a colonic polyp and wherein the instructions for processing the transformed surface representation

to determine a lesion surface which separates the lesion from surrounding normal structure comprise instructions for determining a polyp neck.